CONSTRUCTION
FATALITY DIGEST

QUARTERLY REPORT
VOL. 6 NO. 1
January - March 2017

Inside this Issue

Topics of Interest

HASLAM COLLEGE OF BUSINESS
THE UNIVERSITY OF TENNESSEE, KNOXVILLE

CONSTRUCTION INDUSTRY
RESEARCH & POLICY CENTER

"All types of falls (roof, ladder, structure, opening, etc.) accounted for 40.6% (41 events) in the first quarter of 2017"

Struck by Highway Vehicle is on the Rise

For the first quarter of 2017, CIRPC received 101 reports of fatal events in construction. For the most part the pattern of causes remained similar to the results reported for the last quarter of 2016.

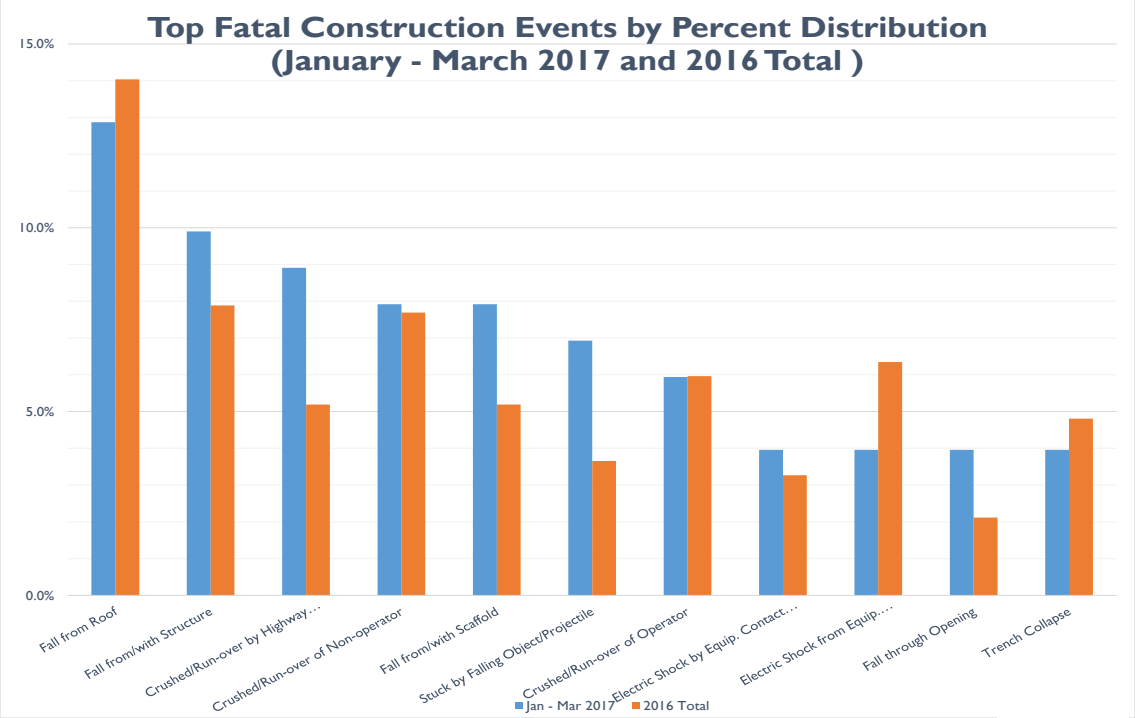
"Fall from Roof" led all categories with 13 events (12.9%) of the 101 events. This is down four percent from the previous quarter (16.9%). "Fall from Roof" for 2016 totaled 73 events (14.0%).

"Fall from/with Structure" was the second leading cause with 10 events (9.9%) followed by "Crushed/Run-over of Non-operator" and "Fall from/with Scaffold" each with 8 events (7.9%).

There was one notable shift. "Crushed/Run-over of Highway Vehicle" jumped to the third leading fatal cause for the first quarter. This was an increase from 4.8% (in the previous quarter) to 8.9% (9 events) for the current quarter. For all of 2016 it accounted for 5.2% of all fatalities.

All types of falls (roof, ladder, structure, opening, etc.) accounted for 40.6% (41 events) in the first quarter of 2017. This is a decrease from 46.0% (57 events) from the previous quarter and less than the 2016 total of 42.3% (220 events).

The chart below compares results for this quarter with results for the entire year of 2016. There were three significant difference in reported percentages from 2016: The aforementioned "Crushed/Run-over of Highway Vehicle" with an increase of 3.7%, "Struck by Fall Object/Projectile" increased from 3.7% to 6.9%, and "Electric Shock from Equipment/Tool Use" decreased from 6.3% to 4.0%.



Regional Breakdown

Of the 101 events reported from the regions in the first quarter of 2017, 27.7% came from Region 4 (28 events), 21.8% (22 events) came from Region 6, and 11.9% (12 events) from Region 5. Regions 4, 5, and 6 accounted for 61.4% of the total.

Of these 64% (65 events) were reported from Federal OSHA states, while 36% (36 events) occurred in State Plan states.

The breakdown by state revealed Texas with the greatest number of events with 16 (15.8%), followed by Florida with 10 (10%), and California with 8 (7.9%).

Fatal Events Reported by OSHA Region

January to March 2017

Region	# of Cases	Percent
1	4	4.0%
2	3	3.0%
3	10	9.9%
4	28	27.7%
5	12	11.9%
6	22	21.8%
7	3	3.0%
8	3	3.0%
9	11	10.9%
10	5	5.0%
Total	101	100.0%

Fatal Events by NAICS Code

A breakdown of top reported fatal events by NAICS code shows "Highway, Street, and Bridge Construction" contractors at the top with 11.9% (12 events) of the total events. Other top codes are "Roofing Contractors" with 9.9% (10 events), followed by "Site Preparation Contractors" with 8.9% (9 events), and "Commercial and Institutional Building Construction" contractors with 7.9% (8 events).

Fatal Events by NAICS Code

Code	Description	# of Cases	Percent
237310	Highway, Street, and Bridge Construction	12	11.9%
238160	Roofing Contractors	10	9.9%
238910	Site Preparation Contractors	9	8.9%
236220	Commercial and Institutional Building Construction	8	7.9%
238130	Framing Contractors	7	6.9%
238210	Electrical Contractors	6	5.9%
238220	Plumbing, Heating, and Air-Conditioning Contractors	6	5.9%
238140	Masonry Contractors	5	5.0%
236118	Residential Remodelers	4	4.0%
237130	Power and Communication Line and Related Structures Construction	4	4.0%
238110	Poured Concrete Foundation and Structure Contractors	4	4.0%
238990	All Other Specialty Trade Contractors	4	4.0%
236115	New Single-Family Housing Construction	3	3.0%
237110	Water and Sewer Line and Related Structures Construction	3	3.0%
238320	Painting and Wall Covering Contractors	3	3.0%
238390	Other Building Finishing Contractors	3	3.0%
238170	Siding Contractors	2	2.0%
238310	Drywall and Insulation Contractors	2	2.0%
236210	Industrial Building Construction	1	1.0%
237120	Oil and Gas Pipeline and Related Structures Construction	1	1.0%
237990	Other Heavy and Civil Engineering	1	1.0%
238120	Structural Steel and Precast Concrete Contractors	1	1.0%
238150	Glass and Glazing Contractors	1	1.0%
238190	Other Foundation, Structure, and Building Exterior Contractors	1	1.0%
		101	100.0%

Top Construction Standard Violations During 2017

For the fatal events of the first quarter of 2017, only 9 cases reported a total of 31 violations of OSHA standards. Since inspectors have up to six months to issue citations on a fatality it is likely that additional citations will be forthcoming.

The violation and their frequencies are listed in the table below. The average number of violations per case with citations issued was 3.44. For the three previous calendar years, 2014, 2015, and 2016 the average number of violations per case was 3.86, 3.24, and 3.43 respectively.

The "Fall Protection" standard is the top violation for the year with 4 occurrences, followed by "Head Protection", "Fall Protection Training", "General Safety & Health Provisions", and "Safety Training and Education" all with 3 occurrences .

When comparing the running total of 2016 calendar year violations with OSHA's top standards violated in Fiscal Year 2016 (per www.osha.gov), there is only one similarity. "Fall Protection" appears as the top violated standard on both CIRPC's and OSHA's list.

Top OSHA Standard Violations Reported

Rank	Std #	Description	# of Occurrences
1	1926.501	Fall Protection	4
T2	1926.100	Head Protection	3
T2	1926.503	Fall Protection Training	3
T2	1926.20	General Safety & Health Provisions	3
T2	1926.21	Safety Training and Education	3
T3	5a1	General Duty Clause	2
T3	1926.453	Aerial Lifts	2
T3	1926.651	Excavation	2

.

Trends in Fatalities – Multiple Fatality Events

If one had to guess the causes of multiple deaths, one could assume a large tragic event, like an explosion/fire event or perhaps an asphyxiation from a toxic vapor in a sewer system/confined space. The table below represents all the multiple fatal events for the past 4+ years and it shows this may not be the case.

"Crushed/Run-over by Highway Vehicle" is the leading cause of multiple deaths with 8 events. The cause may not seem like the obvious choice, it does make sense with the shift of road work from daytime to late/early hours of the day (less cars on the road, so less of a disruption). This would make it more vulnerable to drunk drivers, sun setting/rising glare, and darkness.

Rounding out the other leading causes are "Electric Shock by Equipment Contacting Power Line" and "Fall from/with Bucket" each with 6 events and "Trench Collapse" with 5 events.

The first quarter of 2017 has seen 4 events thus far for the year. This total is almost equal to two previous years (2015 and 2013). The year with the most events was 2014 with a total of 23 multiple death events.

Multiple Fatality Events**
(2013-2016)

Fatality Cause	2017*	2016	2015	2014	2013	Total
Crushed/Run-over by Highway Vehicle	2	2	2	2	0	8
Electric Shock by Equip. Contact Power Line	0	0	2	4	0	6
Fall from/with Bucket	0	1	0	5	0	6
Trench Collapse	0	3	0	1	1	5
Asphyxiation/Inhalation	1	0	0	3	0	4
Lifting Operations	0	0	0	3	1	4
Fall from/with Structure	0	0	0	2	1	3
Fire/Explosion	1	1	0	0	1	3
Collapse of Structure	0	0	0	0	1	1
Crushed/Run-over of Non-operator	0	1	0	0	0	1
Fall from/with Scaffold	0	0	1	0	0	1
Fall from/with Platform	0	0	0	1	0	1
Stuck by Falling Object/Projectile	0	0	0	0	1	1
Unloading-Loading Equip/Materials	0	0	0	1	0	1
Unknown Cause or Other	0	0	0	1	0	1
	4	8	5	23	6	46

* Total through March 31, 2017

** Each event had 2 or more fatalities

Summary of Fatal Events

Below is a random selection of 36 fatal event summaries from the 101 cases reported for the quarter. These narratives are taken directly from the reports filed by the CSHO with only minor editing.

CATEGORY: ROOF FALLS

Inspection Number: 1173216
The employee was working on the roof of the new student center being built. There was a hole cut in the roof covered by plywood that was not marked and not secured. The employee picked up the plywood and started walking, not realizing that the plywood covered a hole. The employee walked into the hole and fell 20 feet to the concrete floor below. There were no witnesses. He was found by his foreman after someone saw a hardhat laying on the roof.

Inspection Number: 1181085
An employee was on top of the roof about 9 feet high while he was saw cutting a wooden roof eave section measuring ¾" thick x 23.5" wide x 41" long. The employee then fell to the concrete pavement ground. There were no witnesses to the accident.

Inspection Number: 1178943
The company had four employees working on a roof installing new shingles. An employee unhooked from his fall protection system to go to the restroom, he was found 15 minutes later face down on the ground by another employee.

Inspection Number: 1181248
The victim was removing a section of corrugated fiberglass roofing when he fell approximately 27 feet to the ground floor below through an uncovered skylight opening.

Inspection Number: 1171144
An employee was on the roof of a commercial building gathering model and serial numbers from several air conditioning and heating units. The decedent had finished gathering the information and was walking back to the scissors lift when he stepped through a fiberglass panel used to let light into the building. The decedent fell approximately 18 feet.

CATEGORY: OTHER FALL EVENTS

Inspection Number: 1192301
An employee was working inside a new home installing drywall on a cathedral ceiling when the scaffold he was working from collapsed resulting in the employee falling 14 feet and striking his head.

Inspection Number: 1180130
The employee was riding in the back of the work truck where a tamper was located. The truck made a turn and caused the tamper to slide towards the rear of the truck. The employee attempted to prevent the tamper from falling off the truck and resulted in him falling off the truck and coming into contact with a curb. The employee fatally struck the back of his head.

Inspection Number: 1184532
An employee fell about 40-feet to the ground during demolition related activities when a section of flooring unexpectedly collapsed. The employee was engaged in deconstructing/salvaging wooden flooring from the fourth level of a five story building just prior to and at the time of the accident. Demolition of some of the building's exterior brick wall, wooden subflooring, and steel framework had been completed prior to the accident.

Inspection Number: 1187466
A worker was riding in the back of a truck along the highway picking up road traffic signs when the worker fell out of the truck and struck the pavement. The worker sustained fatal injuries.

Inspection Number: 1173606
Two employees were constructing a residential pole building with peak of roof approximately 15 feet in height and a 4:12 pitch. An employee was standing on the 7th unsecured truss which was only nailed on the right side and not supported by any bottom cord bracing. The ground employee handed him a 2x4 purlin, when it appears the employee shifted his weight in order to reach the 2x4. He lost his balance and fell grabbing onto the 8th truss causing both trusses to twist over and fall as well. The employee fell approximately 10 feet to the ground hitting his head on multiple rocks.

Inspection Number: 1176970
While walking towards a ridge, the employee stepped on a 2x4 wood purlin and fell approximately 20 feet to the interior of the building. The employee was seriously injured and sustained a head and neck fracture as a result of the fall.

Inspection Number: 1182444
An employee fell from a second floor level in a residential home. The employee sustained injuries that resulted in his death.

Inspection Number: 1172587
A framer, a newly hired permanent full time employee (two weeks), was walking across an exterior wall that was just framed and sheathed. The wall was lying across the second floor deck. The employee stepped through the window opening which was over the stairwell opening and fell 11 feet to the concrete surface below.

CATEGORY: ELECTROCUTIONS

Inspection Number: 1175306
Employees came into contact with an energized power line. The employees were lifting a dead line onto a pole with a block and rope when the line end "sprang up" and contacted a crossing energized line shocking the two employees.

Inspection Number: 1181158
The victim was attempting to hold steady an aluminum extension ladder as its fly section was being raised. As the fly section was raised it contacted a nearby power line resulting in an electrocution.

Inspection Number: 1190137
The victim was working on a commercial storage facility. He was hanging sheet metal by a bucket lift when a gust of wind caught the sheet metal and blew it into overhead power lines. The victim was electrocuted and thrown from the bucket lift.

Inspection Number: 1175230
Two employees performing electrical work inside an electrical room at a facility experienced an electrical arc flash that resulted in an explosion and fire.

CATEGORY: STRUCK BY, RUN OVER, CRUSHED BY OPERATING CONSTRUCTION EQUIPMENT OR VEHICLE

Inspection Number: 1176028
Two workers were spreading gravel in a trench and installing PVC pipes that were going to be used to route electrical power. Part of the work crew involved an excavator operator who was directing the workers in the trench. The excavator operator proceeded to drop gravel into the trench and did not see one of the workers, striking the victim on the head with the bucket.

Inspection Number: 1173800
A truck driver was in his truck attempting to hook up to the belly dump trailer, while the victim was standing nearby. The victim got caught between that trailer and a stationary trailer positioned next to it. The victim was found pinned between the two trailers.

Inspection Number: 1172543
An employee backing a forklift into a parking position struck another employee who was standing behind the forklift using his cell phone. The forklift alarm was working.

Inspection Number: 1173257
An excavator had a hydraulic line rupture, causing the bucket to drop on an employee, striking the back of his head and neck. The employee was transported to the hospital, where he passed away.

CATEGORY: STRUCK BY, RUN OVER, CRUSHED BY OPERATING CONSTRUCTION EQUIPMENT OR VEHICLE (Continued)

Inspection Number: 1188825
Employee was walking with his head down; did not see the rubber tire front-end loader transporting a 60" cement pipe. The two collided, employee received head trauma.

Inspection Number: 1188708
Employee was pinned between a building overhang and the telescopic aerial lift he was operating. Employee broke his neck and passed away.

Inspection Number: 1173518
The victim was crushed by a mechanical loading dock. He was an employee of the demolition company. The victim was found under the dock leveler, while the fork lift driver was away. Nobody witnessed the accident.

Inspection Number: 1187820
It appears the worker was unhooking a lowboy trailer by removing the 2 axle extension. The pin was not properly secured and the equipment dropped on the worker's head. When inspecting the equipment it appeared not to be damaged. It appears the locking pin had not been fully engaged.

Inspection Number: 1173547
An employee was conducting flagging operations at the beginning of an area undergoing utility work. At 11:50 a.m., the employee was struck by a vehicle.

Inspection Number: 1180762
A worker’s aerial lift was struck by a metro-train while he was working from it. The aerial lift was being extended over train track at the time of the accident. Employee fell 30 feet to the ground, and died at the hospital.

CATEGORY: OTHER FATALITY CAUSES

Inspection Number: 1173315
Three employees were overcome by fumes inside a storm drain. They died at the scene. One employee was taken to hospital for evaluation.

Inspection Number: 1192332
The crew had to tunnel under the porch to make way for a large concrete slab. The day laborer was lying on his back with his head and shoulder underneath the porch. The employee was crushed by the porch when the concrete footing moved and collapsed.

CATEGORY: OTHER FATALITY CAUSES (Continued)

Inspection Number: 1173278
Employees were at the site connecting a sewer line to a lift station, when an employee who was performing commercial diving in a 12 foot deep hole became trapped underwater. The safety officer saw the bubbles had stopped and jumped into the water to help the individual. The other employees attempted to rescue him but could not and the employee had to be pulled from the water by fire rescue.

Inspection Number: 1182076
Ten employees were injured while working near a pressurized tank when the tank exploded. The explosion fatally injured three employees and seven more with minor injuries. Only one of the injured employees was admitted to the hospital.

Inspection Number: 1184702
The victim was struck by a pallet of bricks. Witnesses stated the workers were using a pulley system to raise and lower pallets of bricks to different scaffolding levels when the victim pulled on the rope to raise another pallet up to a co-worker, and the pulley came loose and the pallet dropped, striking the victim on the head.

Inspection Number: 1200873
Per the employer, a company was delivering a crate of mirrors to their worksite. While using a boom truck to set the crate of mirrors on the site, the boom on the truck broke loose and fell, striking one of the employees.

Inspection Number: 1192414
Employees were prepping 3' by 26' 18 gauge metal roofing panel for the roof they were repairing after some storm damage to the building. They were using a shop made spreader bar to lift the bundle of metal panels when the spreader bar came off the forks of the rough terrain fork lift when the panels were 5 feet off the ground. The spreader bar is what hit the employee in the head.

Inspection Number: 1181207
A masonry laborer was performing site clean-up operations on the ground below new masonry construction of a commercial building. A brick fell from the third floor of the exterior of the building, striking the laborer in the head and causing fatal injuries.

Inspection Number: 1171547
An employee was cutting the top off of a tree that was resting on power lines. When the final cut was made, the tree top catapulted up about 50 feet and came back down and struck the employee causing a fatal injury.

WORKING IN THE SUMMER HEAT

Heat-related illnesses can be deadly. Thousands become sick every year and many die due to preventable heat-related illnesses. With summer temperatures rising, now is the best time to prepare for working outdoors in excessive heat by following a few simple steps.

HEAT-RELATED ILLNESS: KNOW THE SIGNS

It's important to know the signs of heat-related illness—acting quickly can prevent more serious medical conditions and may even save lives.

- **Heat Stroke** is the most serious heat-related illness and requires immediate medical attention. Symptoms include: confusion, fainting, seizures, very high body temperature and hot, dry skin or profuse sweating. **CALL 911** if a coworker shows signs of heat stroke.
- **Heat Exhaustion** is also a serious illness. Symptoms include: headache, nausea, dizziness, weakness, thirst and heavy sweating. **Heat fatigue**, and **heat rash** are less serious, but they are still signs of too much heat exposure.

If you or a coworker has symptoms of heat-related illness, **tell your supervisor right away.** If you can, move the person to a shaded area loosen his/her clothing, give him/her water (a little at a time), and cool him/her down with ice packs or cool water.

(Information courtesy of OSHA)

We can be contacted at:

Construction Industry Research and Policy Center
The University of Tennessee
Stokely Management Center, Room 202
916 Volunteer Boulevard
Knoxville, Tennessee 37996
Phone: 865-974-4422
E-mail: cirpc@utk.edu

Visit our website!
cirpc.haslam.utk.edu

If you'd like a **free** subscription to this digest, please go to ***http://cirpc.haslam.utk.edu/Digest.asp*** and click "Subscribe."

We would like to thank OSHA's Dave Schmidt for help in obtaining the data used in this newsletter. Comments and suggestions can be directed to John Wagner (jpwagner@utk.edu) as we work together to contribute to a safer construction workplace.